NASA Facts

National Aeronautics and
Space Administration

Marshall Space Flight Center
Huntsville, Alabama 35812

EXPRESS Rack 3

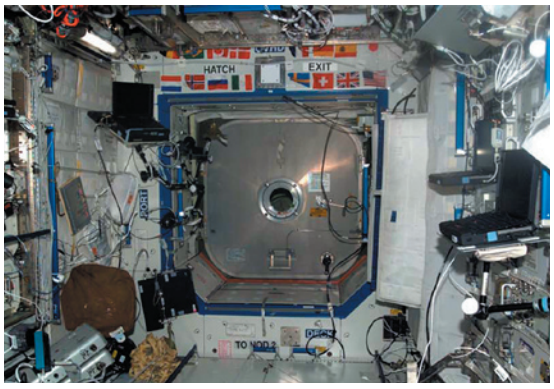
Missions: Expedition Five, ISS Mission UF-2, STS-111 Space Shuttle Flight
Facility Location on ISS: Destiny
Project Manager: Annette Sledd, NASA's Marshall Space Flight Center, Huntsville, Ala.

Overview

Express Rack No. 3 was installed on the Space Station in May 2002. The first two EXPRESS Racks were installed in the International Space Station during Expedition 2 on the STS-100 Space Shuttle Mission, ISS Mission 6A, in April 2001. EXPRESS Racks No. 4 and 5 were installed during Expedition 3 on the STS-105 Space Shuttle Mission, ISS Mission 7A.1, in August 2001.

Like EXPRESS Rack No. 2, EXPRESS Rack No. 3 is equipped with the Active Rack Isolation System (ARIS) — a system that acts as a shock absorber for delicate science experiments that could be damaged by vibrational disturbances.

The EXPRESS Rack is a standardized payload rack system that transports, stores and supports experiments aboard the International Space Station. EXPRESS stands for EXpedite the PRocessing of Experiments to the Space Station, reflecting the fact this system was developed specifically to maximize the Station's research capabilities.



View looking toward Node Two.

The EXPRESS Rack system supports science payloads in several disciplines, such as biology, chemistry, physics, ecology and medicine, including commercial activities. NASA fuels discoveries that make the world smarter, healthier and safer.

Facility Operations

With its standardized hardware interfaces and streamlined approach, the EXPRESS Rack enables quick, simple integration of multiple payloads aboard the International Space Station.

The system is comprised of elements that remain on the International Space Station, as well as elements that travel back and forth between the Space Station and Earth via the Space Shuttle.

EXPRESS Racks stay on orbit continually, while experiments are exchanged in and out of the EXPRESS Racks as needed — remaining on the Space Station for three months to several years, depending on the experiment's time requirements.

Late load experiments are flown in the Shuttle middeck and installed in the EXPRESS Racks on-orbit. Each EXPRESS Rack has eight middeck locker locations and two drawer locations. The middeck locker portion of the rack can be populated by various size containers meeting the attachment interfaces and can be as large as half the rack or as small as a breadbox.

Payloads within EXPRESS Racks can operate independently of each other — allowing for differences in temperature, power levels and schedules.

Experiments contained within EXPRESS Racks may be controlled by the Space Station crew or remotely from the ground by the Payload Rack Officer on-duty at the Payload Operations Center at NASA's Marshall Space Flight Center in Huntsville, Ala.

Seven days a week, 24 hours a day, a rack officer is on-hand to oversee rack maintenance and support experiments. Linked by computer to all payload racks aboard the Station, the officer routinely checks rack integrity, temperature control and the proper working conditions of Station experiments. The EXPRESS Rack system was developed by NASA's Marshall Center and built by the Boeing Co. in Huntsville. Eight EXPRESS Racks have been built for use on the International Space Station.

Flight History/Background

The EXPRESS Rack was successfully tested during the Space Shuttle STS-94 mission in 1997. A primary focus of that mission was to evaluate facilities associated with the Microgravity Science Laboratory-1 payload. The mission served to bridge the gap between the relatively short-duration work done on Shuttle Spacelab flights and the long-duration research to be performed on the Space Station.

Two EXPRESS Rack experiments on STS-94 were activated 14 hours into the flight and ran until the 15th day of the mission. As a result of these experiments, NASA determined the EXPRESS Rack system is able to successfully support subrack payload operations.

Benefits

The EXPRESS Racks are a host facility supporting multi-discipline science experiments with minimal interference from the force of gravity. The results of these various types of research and the effect of limited gravity on the associated processes will hopefully improve the lives of people on Earth. By housing, supporting and transporting these experiments, the EXPRESS Rack could play a key role in the development of better medicines, more powerful computer chips or lighter metals.

Similarly, by reducing the time, complexity and expense historically associated with orbital research, the EXPRESS Rack system will help universities and industry achieve these advances more quickly and for less money.

More information on EXPRESS Racks and the International Space Station can be found at:

http://www.nasa.gov

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